

GeoHC networks - Geothermal energy supplied heating (and cooling) networks

In SAPHEA, a geothermal energy supplied heating (and cooling) network ('geoHC network') can be characterized in the following way:

- Local to city-scale heating (and cooling) networks operating at temperature ranges below 30°C and up to around 120°C and peak load capacity levels between around 500 kW and several tens to hundreds of MW
- Geothermal energy provides base load supply or seasonal heat storage for on-site available, fluctuating heat sources
- Maximizing the use of local heat sources while limiting high enthalpy heat carriers to a minimum to foster the resilience of heating and cooling supply
- Offering greenfield solutions and concepts to modernize and upgrade existing district heating networks towards the reduction of fossil fuels and dependency on imported energy carriers.

Figure: General scheme of a multivalent HC network supplied by geothermal energy

Geothermal energy has the potential to play a vital role inside such geoHC networks by offering zero emission stable base load supply and heat storage in the subsurface. This means that geoHC networks offer the benefit of capitalizing fluctuating on-site RES, such as solar thermal or ambient heat, or excess energy in terms of waste heat by applying high volume underground storage. In turn, cost-efficient geothermal energy (low OPEX) provides baseload supply. Such networks may operate at a high level of efficiency by matching the low-temperature demands of clients with low-temperature sources. High enthalpy renewable heat sources, such as green gas or biomass, are limited to peak load and backup supply, saving those energy carriers for purposes that are more and critical towards supply shortcomings.

